

Alberta Ambient Air Quality Objectives and Guidelines

Issued April 2009

The Alberta *Environmental Protection and Enhancement Act* (EPEA) allows Alberta Environment to develop ambient air quality objectives and guidelines for all or part of the province to protect Alberta's air quality.

Alberta's objectives are equal to or more stringent than existing National Ambient Air Quality Objectives and Canada Wide Standards. Alberta has developed or adopted objectives from other jurisdictions where there are no national objectives or Canada Wide Standards.

Air quality objectives are generally established for one-hour, 24-hour, and annual averaging periods. Occasionally, the underlying information or ambient monitoring method requires that other averaging periods be used. For example, a three-day objective was set for ethylene as experimental evidence indicated that this was a more appropriate averaging period than 24-hours.

Objectives and guidelines are based on an evaluation of scientific, social, technical, and economic factors.

CONSULTATION

Alberta Environment works with a variety of stakeholders, including other government departments, the scientific community, environmental organizations, industry and the

general public to prioritize substances and to review Objectives and Guidelines.

REPORTING AIR QUALITY

The Ambient Air Quality Objectives are compared to actual air quality measurements to report on the state of Alberta's environment, special ambient air quality surveys and current air quality through the Air Quality Index.

INDUSTRIAL FACILITIES

All industrial facilities must be designed and operated such that the ambient air quality remains below Ambient Air Quality Objectives.

USE OF OBJECTIVES (Table 1)

Objectives are used:

- to determine adequacy of facility design
- to establish required stack heights and other release conditions
- to assess compliance and evaluate facility performance

USE OF GUIDELINES (Table 2)

Guidelines may be used:

- for airshed planning and management
- as a general performance indicator
- to assess local concerns

TABLE 1 ALBERTA AMBIENT AIR QUALITY OBJECTIVES

Substance	$\mu\text{g m}^{-3}$	ppbv *	Basis	Effective
Acetaldehyde				1999
1-hour average	90	50	Adopted from Texas	
Acetic acid				1999
1-hour average	250	102	Adopted from Texas	
Acetone				1999, reviewed 2005
1-hour average	5,900	2,400	Adopted from Texas	

Substance	$\mu\text{g m}^{-3}$	ppbv *	Basis	Effective *
Acrylic acid				January 1, 2004
1-hour average	60	20	Adopted from Texas	
Annual average	1.0	0.34	Adopted from California	
Acrylonitrile				January 1, 2004
1-hour average	43	19	Adopted from Texas	
Annual average	2	0.9	Adopted from California	
Ammonia				1976, reviewed 2004
1-hour average	1,400	2,000	Odour perception	
Arsenic				May 1, 2005
1-hour average	0.1	-	Adopted from Texas	
Annual average	0.01	-	Adopted from Texas	
Benzene				1999
1-hour average	30	9	Adopted from Texas	
Benzo[a]pyrene				June 1, 2009
Annual average	0.3 ng m^{-3}	2.9 $\times 10^{-5}$	Chronic and carcinogenic human health effects	
Carbon disulphide				1999, reviewed 2005
1-hour average	30	10	Odour threshold	
Carbon monoxide				1975
1-hour average	15,000	13,000	Oxygen carrying capacity of blood	
8-hour average	6,000	5,000		
Chlorine				1999
1-hour average	15	5.0	Adopted from Texas	
Chlorine dioxide				1999
1-hour average	2.8	1	Adopted from Texas	
Chromium				1999
1-hour average	1	-	Adopted from Texas	
Cumene				May 1, 2005
1-hour average	500	100	Adopted from Texas	
Dimethyl ether				1999
1-hour average	19,100	10,100	Adopted from Texas	
2-Ethylhexanol				May 1, 2005
1-hour average	600	110	Adopted from Ontario	
Ethylbenzene				May 1, 2005
1-hour average	2000	460	Adopted from Texas	
Ethyl chloroformate				1999
1-hour average	0.57	0.13	Stack emission limits	
Ethylene				January 1, 2004
1-hour average	1,200	1,050	Crop yield	
3-day average	45	40	Crop yield	
Annual mean	30	26	Conifers and perennials	
Ethylene oxide				1999
1-hour average	15	8.0	Adopted from Ontario	
Formaldehyde				1999, reviewed 2007
1-hour average	65	53	Adopted from Texas	

Substance	$\mu\text{g m}^{-3}$	ppbv *	Basis	Effective
n-Hexane				August 1, 2008
1-hour average	21,000	5,960	Derived from 24-hour California objective	
24-hour average	7,000	1,990	Adopted from California	
Hydrogen chloride				1999
1-hour average	75	50	Adopted from Texas	
Hydrogen fluoride				1999, reviewed 2009
1-hour average	4.9	6.0	Adopted from Texas	
Fluoride content in forage			Adopted from Ontario	?? 2009
30-day average	35 $\mu\text{g g}^{-1}$		monthly result for April 1 to October 31	
Average for any single 30-day period	80 $\mu\text{g g}^{-1}$		November 1 to March 31	
Average for two consecutive months	60 $\mu\text{g g}^{-1}$		(60 days) during the year	
Hydrogen sulphide				1975
1-hour average	14	10	Odour perception	
24-hour average	4	3		
Isopropanol				May 1, 2005
1-hour average	7,850	3,190	Adopted from Texas	
Lead				1999
1-hour average	1.5	-	Adopted from Texas	
Manganese				May 1, 2005
1-hour average	2	-	Adopted from Texas	
Annual average	0.2	-	Adopted from Texas and California	
Methanol				1999
1-hour average	2,600	2,000	Adopted from Texas	
Methylene bisphenyl diisocyanate				1999
1-hour average	0.51	0.050	Adopted from Texas	
Monoethylamine				1999
1-hour average	1.19	0.645	Stack emission limits	
Nickel				May 1, 2005
1-hour average	6	-	Adopted from California	
Annual average	0.05	-	Adopted from California	
Nitrogen dioxide				1975
1-hour average	400	212	Odour perception	
24-hour average	200	106		
Annual average	60	32		
Ozone (ground level)				1975, reviewed 2007
1-hour average	160	82	Pulmonary function	
Particulate Matter				
Fine - 2.5 microns or less				2007
24-hour average	30		Canada Wide Standard	
Total suspended				1975
24-hour average	100		Pulmonary effects	
Annual geometric mean	60			

Substance	$\mu\text{g m}^{-3}$ †	ppbv *	Basis	Effective
Pentachlorophenol				November 1, 2004
1-hour average	5.0	0.44	Adopted from Texas	
Annual average	0.5	0.04	Adopted from Texas	
Phenol				1999
1-hour average	<u>100</u>	26.0	Adopted from Ontario	
Phosgene				1999
1-hour average	4	1	Adopted from Texas	
Propylene oxide				January 1, 2004
1-hour average	480	<u>200</u>	Adopted from Oklahoma	
Annual average	<u>30</u>	13	Adopted from California	
Styrene				1999
1-hour average	215	52.0	Adopted from Texas	
Sulphur dioxide				1975, reviewed 1987
1-hour average	<u>450</u>	172	Pulmonary function	
24-hour average	150	57	Begonia, bluegrass, aspen, forests	
Annual average	<u>30</u>	11	Natural forests, lichens	
Sulphuric acid				1999
1-hour average	<u>10</u>	2.5	Adopted from Texas	
Toluene				May 1, 2005
1-hour average	1,880	499	Adopted from Texas	
24-hour average	<u>400</u>	106	Adopted from Michigan and Washington	
Vinyl Chloride				1999
1-hour average	130	51	Adopted from Texas	
Xylenes				May 1, 2005
1-hour average	2,300	529	Adopted from Ontario	
24-hour average	<u>700</u>	161	Adopted from California	

† $\mu\text{g m}^{-3}$ is the weight, in micrograms, of the substance in one cubic meter of air.

* Standard conditions of 25°C and 101.325 kPa are used as the basis for conversion from $\mu\text{g m}^{-3}$ to ppbv (parts per billion by volume) or from mg m^{-3} to ppmv (parts per million by volume).

Note: Underscore indicates this digit is the last significant figure in the number e.g. 100 has two significant figures.

TABLE 2 ALBERTA AMBIENT AIR QUALITY GUIDELINES

Parameter	Guideline		Effective
Dustfall			1975
30 days	53 mg 100 cm ⁻²	In residential and recreation areas	
30 days	158 mg 100 cm ⁻²	In commercial and industrial areas	
Particulate Matter			2007
Fine - 2.5 microns or less			
1-hour	80 µg m ⁻³	Derived from the Canada Wide Standard	
Static fluorides			Pre 1976
30 days	40 µg 100 cm ⁻²	Water soluble fluorides	
The following are being phased out			
Static total sulphation			Pre 1976
	0.50 mg 100 cm ⁻²	SO ₃ equivalent per day as a 1-month accumulated loading	
Static hydrogen sulphide			Pre 1976
	0.10 mg 100 cm ⁻²	SO ₃ equivalent per day as a 1-month accumulated loading	

FOR MORE INFORMATION

For more information on Alberta's Ambient Air Quality Objectives, contact:

Alberta Environment
Air Policy Branch
 Phone: (780) 427-4979
 Fax: (780) 644-8946

More information on Alberta's Air Quality Objectives is available online at
www.environment.alberta.ca/

